

## C L A I M S

1. A recombinant poxvirus comprising at least two homologous foreign genes with a homology of at least 50%,  
5 wherein each of said genes is inserted into a different insertion site of the viral genome.

2. A recombinant poxvirus comprising at least two homologous foreign genes, said genes having a homology of  
10 at least 60%.

3. The recombinant poxvirus according to claim 1 or 2, wherein the genes have a homology of 65-75%.

15 4. The recombinant poxvirus according to claims 1 to 3, wherein the genes are derived from a flavivirus.

5. The recombinant poxvirus according to claim 4, wherein the flavivirus is a Dengue virus.  
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6. The recombinant poxvirus according to claim 4 or 5, wherein the genes are at least two homologous genes derived from at least two different serotypes of the virus.  
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7. The recombinant poxvirus according to claims 4 to 6, wherein the genes are at least two PrM genes.

8. The recombinant poxvirus according to claims 4 to 7,  
30 wherein the genes are 4 PrM genes.

9. The recombinant poxvirus according to claims 1 to 8, wherein the poxvirus is a Vaccinia virus.

10. The recombinant poxvirus according to claim 9, wherein the Vaccinia virus is a Modified Vaccinia Ankara (MVA) virus.

5 11. The recombinant poxvirus according claim 10, wherein the MVA is MVA-BN deposited at the European Collection of Animal Cell Cultures (ECACC) under number V00083008.

10 12. The recombinant poxvirus according to claims 1 to 11, wherein the poxvirus is replication deficient or replication incompetent in mammalian cells, including human cells.

15 13. The recombinant poxvirus according to claims 1 to 12, wherein the genes are inserted into a naturally occurring deletion site and/or into an intergenic region of the poxviral genome.

20 14. The recombinant poxvirus according claims 1 to 13 as medicament or vaccine.

15. A vaccine comprising the recombinant poxvirus according to any of the claims 1 to 13.

25 16. A pharmaceutical composition comprising the recombinant poxvirus according to any of the claims 1 to 13 and a pharmaceutically acceptable carrier, diluent, adjuvant and/or additive.

30 17. The recombinant poxvirus according to any of the claims 1 to 13, the vaccine according to claim 15 or the composition according to claim 16 for affecting, preferably inducing, an immune response of a living animal, including a human.

18. Use of the recombinant poxvirus according to any of the claims 1 to 13 for the preparation of a medicament.

5 19. A method for affecting, preferably inducing, an immune response in a living animal, including a human, comprising administering a therapeutically effective amount of the recombinant poxvirus according to any of the claims 1 to 13, the vaccine according to claim 15 or  
10 the composition according to claim 16 to the animal or human to be treated.

20. A cell comprising the recombinant poxvirus according to claims 1 to 13.

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21. A method for producing a recombinant poxvirus according to claims 1 to 13 comprising the steps of

- infecting a cell with a poxvirus;
- transfecting the infected cell with a first vector  
20 construct comprising a gene being heterologous to the poxviral genome, and a genomic poxvirus sequence capable of directing the integration of the heterologous gene into an insertion site of the poxviral genome;
- 25 - identifying, isolating and, optionally, purifying the generated recombinant poxvirus;
- repeating the above steps by using the recombinant poxvirus obtained from previous steps for infecting the cell and an additional vector construct  
30 comprising a further gene being heterologous to the poxviral genome and homologous to the gene of the first vector construct.

22. A kit comprising

- two or more vector constructs, each construct comprising a gene under transcriptional control of a poxviral expression control element, wherein the genes included in the different vectors are homologous genes, and wherein each gene is flanked by a poxviral DNA sequence capable of directing the integration of the gene into a poxviral genome, and means for identifying and/or selecting recombinant poxviruses, which have incorporated said homologous genes into their genome.

23. The kit according to claim 22, wherein each homologous gene is flanked by a poxviral DNA sequence capable of directing the integration of said homologous gene of each vector construct into a different insertion site of the poxviral genome.

24. A DNA sequence derived from or homologous to the recombinant poxviral genome of the recombinant poxvirus according to claims 1 to 13, wherein said DNA sequence comprises at least two homologous genes and at least part of the sequences of the poxviral genome.

25. A method for detecting cells infected with the recombinant poxvirus according to claims 1 to 13, said method comprising administering the DNA sequence according to claim 24 to said cells.

26. A method for identifying the recombinant poxvirus according to claims 1 to 13, said method comprising administering the DNA sequence according to claim 24 to said virus.